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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEYS DOCKET NUMBER

19071.6

U.S. APPLICATION NO

10/019185

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US).
CONCERNING A FILING UNDER 35 U.S.C. 371

INTERNATIONAL APPLICATION NO.
PCT/EP00/06289

INTERNATIONAL FILING DATE
July 05, 2000

PRIORITY DATE CLAIMED
July 13, 1999

TITLE OF INVENTION: METHOD FOR THE MANUFACTURE OF MULTILAYER
BRISTLE MATERIAL, MULTILAYER BRISTLE AND THE USE THEREOF

APPLICANT(S) FOR DO/EO/US

WEIHRAUCH, Georg

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I)
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C.371(c)(2)).
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C.371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C.371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C.371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C.371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 1. Form PCT/IB/308
 2. Return Postcard
 3. Conditional Petition to Revoke

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7. The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1)-(5)):
Search Report has been prepared by the EPO or JPO..... \$ 890.00

International preliminary examination fee paid to USPTO.....\$710.00

No international preliminary examination fee paid to USPTO but international search fee paid to USPTO.....\$740.00

Neither international preliminary examination fee nor international search fee paid to USPTO.....\$1040.00

International preliminary examination fee paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4).....\$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

CALCULATIONS		PTO USC Only
\$	890	
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\$	18	
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\$	908	
\$	908	
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\$	40	
\$	948	
Amount to be:		
refunded		\$
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- a. A check in the amount of \$ _____ to cover the above fees is enclosed.
- b. ☒ Please charge my Deposit Account No. 50-0698 in the amount of \$ 948 to cover the above fees.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0698. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

Please send all correspondence
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	WEIHRAUCH, Georg) Examiner:
PCT Application No.:	PCT/EP00/06289) unknown
PCT Filing Date:	July 05, 2000) Art Unit:
For:	METHOD FOR THE MANUFACTURE) unknown
	OF MULTILAYER BRISTLE)
	MATERIAL, MULTILAYER BRISTLE)
	AND THE USE THEREOF)

Docket No.: 19071.6

Assistant Commissioner for Patents

Washington, DC 20231

U.S.A.

PRELIMINARY AMENDMENT

Dear Sir:

Please enter this amendment prior to calculation of the filing fees. This amendment is based on the translation of the application **as amended on August 30, 2001.**

IN THE SPECIFICATION:

On page 1, insert as a title prior to the first paragraph --
BACKGROUND OF THE INVENTION --.

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On page 4, insert as a title prior to the third paragraph --
SUMMARY OF THE INVENTION --.

Please replace the third paragraph on page 4 as follows --

On the basis of the method according to the invention, this problem is solved in that the core and the intermediate layer are co-extruded and following removal to a predetermined withdrawal length at which the intermediate layer has transformed into a sufficiently solid state, the continuous material is introduced onto the intermediate layer with pre-tensioning. --.

On page 8 insert as a title prior to the brief description of the drawings --

BRIEF DESCRIPTION OF THE DRAWING --.

On page 9 insert as a title following the brief description of the drawing --

DESCRIPTION OF THE PREFERRED EMBODIMENT --.

On page 11, line 1, replace as a title "Claims" with --
I CLAIM: --.

IN THE CLAIMS:

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Please delete **PCT amended claims 1 - 20** without prejudice and enter new claims 21 - 41 as indicated below:

21. A method for the manufacture of multi-layer bristle material comprising a core which mainly determines a bending behavior of the bristle, a covering structure of continuous material mainly determining a brushing behavior of the bristle, and a layer intermediate between the core and the covering structure, the method comprising the steps of:

- a) co-extruding a core together with an intermediate layer covering said core;
- b) withdrawing said co-extruded core and intermediate layer such that said intermediate layer changes into a partially solidified state;
- c) pre-tensioning a continuous material; and
- d) applying said pre-tensioned continuous material onto said intermediate layer following steps b) and c) to partially embed said continuous material in said intermediate layer.

22. The method of claim 21, wherein said intermediate layer is made from a material which is reactivatable after processing, and further comprising reactivating said intermediate layer following application of said

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continuous material and returning said intermediate layer to a solid phase to at least partial embed said continuous material.

23. The method of claim 21, wherein said intermediate layer comprises a foamable material and further comprising foaming said intermediate layer following application of said continuous material.
24. The method of claim 21, further comprising drawing said co-extruded core and intermediate layer prior to applying said continuous material in step d).
25. The method of claim 21, further comprising subsequent drawing of said core, said intermediate layer, and said continuous material following step d).
26. The method of claim 21, further comprising externally treating the bristle following application of said continuous material to said intermediate layer in step d).
27. The method of claim 21, further comprising longitudinally cutting open said continuous material at least over partial lengths of the bristle.

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28. The method of claim 21, further comprising applying a film to said continuous material following application of said continuous material to said intermediate layer in step d).
29. The method of claim 21, wherein a textile material is applied as said continuous material.
30. The method of claim 21, wherein one of a smooth and roughened textile material is applied as said continuous material.
31. The method of claim 29, wherein said textile material is wound on.
32. The method of claim 29, wherein said textile material is looped on.
33. The method of claim 29, wherein said textile material is absorbing.
34. A multi-layer bristle comprising:
- an extruded core mainly defining a bending characteristic of the bristle;
 - an intermediate layer co-extruded together with said core to cover said core; and

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continuous material wound or looped onto said intermediate layer and at least partially embedded in said intermediate layer to adhere thereto, said continuous material forming a covering structure mainly defining a brushing characteristic of the bristle.

35. The bristle of claim 34, wherein said intermediate layer is made from a softer material than said core.
36. The bristle of claim 34, wherein said intermediate layer comprises a rubber-elastic material.
37. The bristle of claim 34, wherein said intermediate layer comprises a foamed material.
38. Method for using the bristle of claim 34 for a bristle configuration in brushes or paint brushes.
39. Method for using the bristle of claim 34 as an interdental cleaner.
40. Method for using the bristle of claim 34 for applying liquid or pulverulent media incorporated in a textile material.

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41. Method for using the bristle of claim 38 for applying liquid or pulverulent media incorporated in a textile material.

REMARKS

The amendments have been taken to adapt this application to United States practice. No new matter has been added.

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Enclosures:
amended specification paragraph in square bracketed,
underlined form

Page 4 third paragraph

On the basis of the method according to the [preamble of claim 1] invention, this problem is solved in that the core and the intermediate layer are co-extruded and following removal to a predetermined withdrawal length at which the intermediate layer has transformed into a sufficiently solid state, the continuous material is introduced onto the intermediate layer with pre-tensioning.

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Translation of PCT/EP00/06289 as filed on July 5, 2000

METHOD FOR THE MANUFACTURE OF MULTILAYER

BRISTLE MATERIAL, MULTILAYER BRISTLE AND THE USE THEREOF

The invention relates to a method for the manufacture of multi-layer bristle material comprising a core which mainly determines the bending capacity of the bristle, a covering layer mainly determining the brushing action and an intermediate layer, in that the core is manufactured by extrusion, is then provided with the intermediate layer from a liquid to viscous phase and then with the covering layer.

The invention relates to bristle material such as is used for the manufacture of brushes for cleaning, polishing or applying media, for paint brushes, interdental cleaners, etc.. The action of a bristle or a bristle configuration comprising several bristles and/or bristle bundles is on the one hand dependent on the choice of material and on the other on the structure of the bristle and particularly its surface. A part is played by the ends of the bristles essentially only during cleaning or penetrating gaps, cavities, etc., whereas the main action part of the bristle is formed by the bristle shank, which is bent round on pressure application and produces a wiping to scraping or even a roughening action. Thus, decisive importance for the sought action is attached to the surface structure of the bristle shank.

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This finding has led to numerous bristle constructions. Thus, it is known (US 4373541) to directly geometrically structure the surface of a bristle. However, the production processes for such bristles are extremely complicated. In addition, two-component bristles are known (WO 97/25902, US 3 698405), which comprise one or more monofilaments and a jacket enveloping the latter. It is also known to twist or otherwise combine several monofilaments to form a bristle (DE 1222888, DE 19640853, JP 3289906). However, although the production of such a bristle material is comparatively simple, the monofilaments must be joined together by means of adhesives or in some other suitable manner in order to obtain a stable union. The design of the ends of such bristles is problematical, because they cannot be rounded, which is necessary for many bristle uses.

Finally, bristles and interdental cleaners are known (DE 37 17 475, US 3 698 405), in which an adhesion promoting coating is applied to a bearing monofilament core and fibers are then flocked onto the moist coating. The fibers are to be essentially perpendicular to the surface. Although such bristles can lead to novel effects and can in particular be used for absorbing coating media, the short fibers do not have an adequate hold on the monofilament surface, so that over a period of time they loosen and drop out. This not only leads to a reduction of the sought action, but the dropped out fibers are extremely undesirable on the surface being treated. If such bristles are used in the hygienic sector,

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e.g. in oral and dental care, dropped out bristles lead to extremely unpleasant effects.

The problem of the invention is to propose a method for the manufacture of bristle material from which it is possible to produce bristles with a bristle shank action matched to the intended use. The invention also aims at providing a corresponding bristle.

On the basis of the method according to the preamble of claim 1, this problem is solved in that the intermediate layer is brought into an approximately dry state and then the covering layer of a continuous material is applied to the intermediate layer and is embedded into the latter.

Unlike in the case of the known, three-component bristles, the adhesion promoting intermediate layer following application to the core material, which can comprise monofilaments or multi-filaments, is initially brought into a dry state and then the continuous material covering layer is applied to the intermediate layer and in conjunction with the application or thereafter the continuous material is at least partly incorporated or embedded into the intermediate layer.

Incorporation can e.g. take place in that the continuous material is applied to the intermediate layer under a pretension. If the intermediate layer has a corresponding soft setting and is plastically deformable, the pretension is

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sufficient in order to incorporate and immovably hold the continuous material in the intermediate layer.

Instead the intermediate layer can be made from a material which can be reactivated after processing. In this case the continuous material is applied to the dry and optionally also no longer deformable intermediate layer. During or after the application of the continuous material the intermediate layer is reactivated and subsequently returned to its solid phase accompanied by the embedding of the continuous material.

As a result of the reactivation the intermediate layer becomes soft, so that the continuous material applied sinks in to a certain extent. The intermediate layer can also have an adhesive action and can e.g. comprise a hot melt adhesive, so that the continuous material is joined to the core by adhesion. However, it is always ensured that the structure given by the continuous material to the bristle shank is completely or preponderantly maintained and that there is no detachment of the covering layer formed from the continuous material.

It is also possible to apply an intermediate layer of a foamable material and to foam the intermediate layer following the application of the continuous material, so that the intermediate layer at least partly surrounds the continuous material and in this way the latter is embedded into the intermediate layer. It is also possible to have a deeper embedding if the intermediate layer comprises a soft

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or flexible foam, which correspondingly gives way under pressure and consequently frees the continuous material. The core and intermediate layer are preferably co-extruded and after a given removal distance during which the intermediate layer has passed into an adequately firm, no longer smearing state, the continuous material is applied to the intermediate layer.

As monofilaments for bristles have to be stretched in order to give the bristle the necessary flexural strength, in a further variant of the method according to the invention the core together with the intermediate layer are co-extruded and stretched and only subsequently is the continuous material applied. Optionally the core with the intermediate layer and the applied continuous material can then be further stretched.

According to another embodiment, following the application of the continuous material to the intermediate layer a film is applied to smooth a given, pronounced profiling caused by the endless material.

It is also possible, following the application of the continuous material to the intermediate layer, to externally subsequently treat the bristle material. This can be a mechanical working, a dipping or the application of coating media. A mechanical working can comprise the longitudinal cutting open of the continuous material, at least over

partial lengths of the bristle material, so that free fiber ends with a corresponding cleaning, polishing or similar action are obtained.

As the continuous material is preferably applied a textile material which can have a smooth or a roughened surface. Thus, for the first time a combination of plastic monofilaments with a textile material on the outside is provided, which has an adequate adhesion to the intermediate layer. The textile material can be wound or looped on.

If an absorbing textile material is used, e.g. a roughened yarn or the like, this leads to numerous care and cleaning possibilities, as well as the introduction of liquid to finely powdered media, which can be delivered again during use.

The continuous material can also comprise an ultra-fine metal wire or a plastic monofilament with abrasive characteristics.

The invention also relates to a multi-layer bristle, which comprises a core mainly determining the bending capacity, a covering layer mainly determining the brushing action and an intermediate layer for promoting adhesion. According to the invention, such a bristle is characterized in that the covering layer comprises a continuous material wound or looped onto the intermediate layer and the continuous material is at least partly incorporated or embedded into the intermediate layer.

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Preferably the intermediate layer is made from a softer material than the core, which can comprise a monofilament or multi-filament. The intermediate layer can in particular comprise a rubber-like material, which permits an incorporation of the continuous material solely through the pretension thereof on winding. The same applies for an intermediate layer of a foamed material.

The bristle constructed according to the invention can be used for numerous different purposes, e.g. for the bristle configuration of brushes or paint brushes. Alone it can serve as an interdental cleaner. It can finally be advantageously used for implements, particularly brushes or paint brushes used for applying liquid or pulverulent media, which are then embedded in the textile material.

The invention is described in greater detail hereinafter relative to embodiments and with reference to the attached drawings, wherein show:

Fig. 1 a perspective view of a portion of the bristle material in a first embodiment.

Fig. 2 a cross-section through the bristle material according to fig. 1.

Fig. 3 a longitudinal view of the bristle material in another embodiment.

Fig. 4 a cross-section through the bristle material in a further embodiment.

In the embodiment according to Fig. 1 the bristle material 1 has a core 2 essentially determining the bendability of the finished bristle and formed from one or more plastic monofilaments. Onto the core 2 is applied an intermediate layer 3, which is preferably made from a softer material. Onto the intermediate layer is applied a continuous material 4, e.g. a natural or synthetic textile material, which at least on its side facing the intermediate layer is incorporated or embedded in the latter, so that the continuous material 4 is fixed to the intermediate layer 3. It is naturally also possible to wind several continuous fibers on in parallel or crosswise.

In the embodiment according to Fig. 3 the bristle material 1 once again has a core and an intermediate layer onto which the continuous material 4 is not only wound, but simultaneously also looped. As in the case of the bristle material according to Figs. 1 and 2, the continuous material can be embedded into the intermediate layer by corresponding pretension. Instead of or in addition thereto the intermediate layer can be made from a material which undergoes a change of state through an activation process, e.g. by heat action, and as a result the embedding of the continuous material takes place or is assisted.

The core can have any random cross-sectional shape adapted to the intended use and an embodiment is shown in fig. 4. The bristle material 1 has a roughly rhombic core 5 to which the intermediate layer 6 is applied and simultaneously fills the convex spaces of the core 5. To said intermediate layer is then applied, e.g. wound or looped on the continuous material. As a result of the profiling of the core 5, a bristle of the bristle material according to fig. 4 has preferred bending directions. As a result of the convex areas filled with the intermediate layer the wear behavior can be influenced. The bristle shank action sought through the continuous material occurs to different extents over the bristle circumference.

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CLAIMS

1. Method for the manufacture of multi-layer bristle material comprising a core which mainly determines the bending capacity of the bristle, a covering layer mainly determining the brushing action and an intermediate layer, in that the core is manufactured by extrusion, is then provided with the intermediate layer from a liquid to viscous phase and then with the covering layer, characterized in that the intermediate layer is brought into an approximately dry state and then the covering layer of a continuous material is applied to the intermediate layer and is embedded into the latter.
2. Method according to claim 1, characterized in that the continuous material is applied to the intermediate layer under pretension.
3. Method according to claim 1 or 2, characterized in that the intermediate layer is made from a material which is reactivatable after processing and that following the application of the continuous material the intermediate layer is reactivated and is then returned to its solid phase accompanied by an at least partial embedding in of the continuous material.
4. Method according to claim 1 or 2, characterized in that an intermediate layer of a foamable material is applied

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and is foamed following the application of the continuous material.

5. Method according to one of the claims 1 to 4, characterized in that the core and intermediate layer are co-extruded and following a given removal distance the continuous material is applied to the intermediate layer.
6. Method according to one of the claims 1 to 5, characterized in that the core together with the intermediate layer are co-extruded and stretched and subsequently the continuous material is applied.
7. Method according to one of the claims 1 to 6, characterized in that the core with the intermediate layer and the continuous material applied undergo subsequent stretching.
8. Method according to one of the claims 1 to 7, characterized in that following the application of the continuous material to the intermediate layer the bristle material is externally subsequently treated.
9. Method according to one of the claims 1 to 8, characterized in that, at least over partial lengths of the bristle material, the continuous material is longitudinally cut open.

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10. Method according to one of the claims 1 to 8,
characterized in that following the application of the
continuous material to the intermediate layer a film is
applied to the continuous material.
11. Method according to one of the claims 1 to 10,
characterized in that a textile material is applied as
the continuous material.
12. Method according to one of the claims 1 to 11,
characterized in that a smooth or roughened textile
material is applied as the continuous material.
13. Method according to claim 11 or 12, characterized in that
the textile material is wound on.
14. Method according to one of the claims 11 to 13,
characterized in that the textile material is looped on.
15. Method according to one of the claims 11 to 14,
characterized in that an absorbing textile material is
applied.
16. Multi-layer bristle comprising a core mainly determining
the bending capacity, a covering layer mainly determining
the brushing action and an intermediate layer for
promoting adhesion, characterized in that the covering
layer comprises a continuous material wound or looped

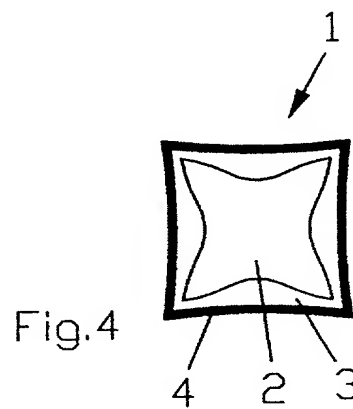
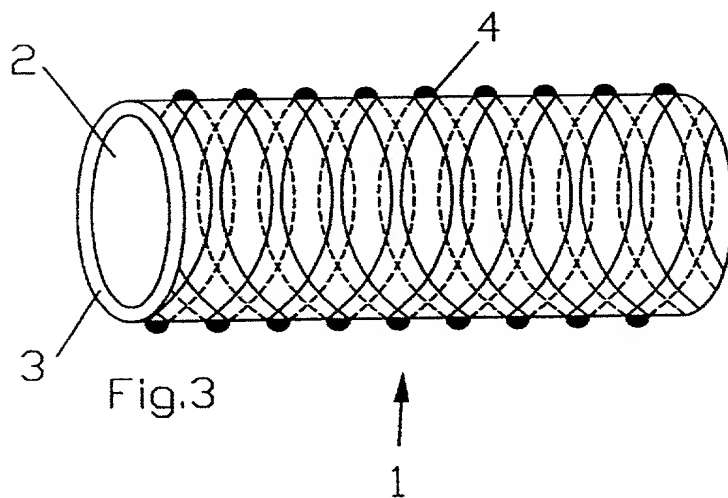
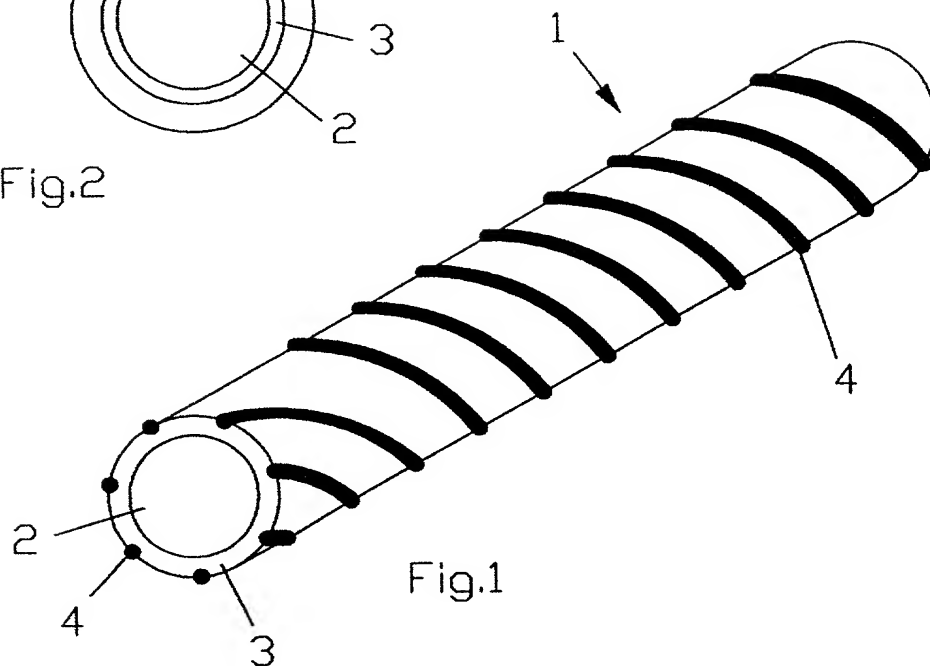
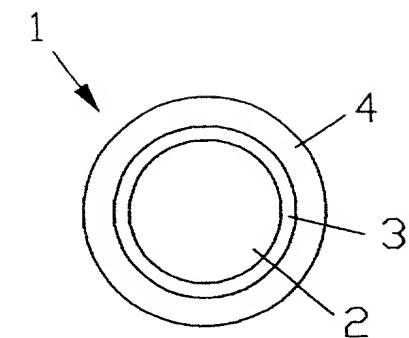
onto the intermediate layer and which is at least partly embedded into the intermediate layer.

17. Bristle according to claim 16, characterized in that the intermediate layer is made from a softer material than the core.
18. Bristle according to claim 16 or 17, characterized in that the intermediate layer comprises a rubber-like material.
19. Bristle according to one of the claims 16 to 18, characterized in that the intermediate layer comprises a foamed material.
20. Use of a bristle according to one of the claims 16 to 19 for the bristle configuration of brushes or paint brushes.
21. Use of a bristle according to one of the claims 16 to 19 as an interdental cleaner.
22. Use of a bristle according to one of the claims 16 to 19 for implements, particularly brushes or paint brushes, for applying liquid or pulverulent media, which are incorporated in the textile material.

ABSTRACT

For the manufacture of multi-layer bristle material comprising a core mainly determining the bending capacity of the bristle, a covering layer mainly determining the brushing action and an intermediate layer, the core is manufactured by extrusion and subsequently the intermediate layer is applied from a liquid to viscous phase. If the intermediate layer is an approximately dry state the covering layer of a continuous material, preferably a synthetic textile material, is applied to the intermediate layer and is embedded into the latter.

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COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD FOR THE MANUFACTURE OF MULTILAYER BRISTLE MATERIAL,
MULTILAYER BRISTLE AND THE USE THEREOF

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No. _____

on _____

and was amended

on _____ (if applicable)

☒ was filed as PCT international application

Number PCT/EP00/06289

on July 05, 2000

and was amended under PCT Article 19

on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me or other person(s) involved in the preparation or prosecution of this application to be material to the examination of this application and to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby authorize the U.S. attorney or agent named herein to accept and follow instructions from _____

as to any action taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119	
Germany	199 32 368.2	13. July 1999	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration For Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

19071.6

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NUMBER	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (List name and registration number)

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201	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
203	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare under penalty of perjury under the laws of the United States of America that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE Dec. 19, 2001	DATE	DATE